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ing begins. First, with a large knife the skin is ripped on the upper side of the body its whole length, then skinned down as far as practicable without rolling it over. The coating of fat that lays between the skin and the flesh, being from one to seven inches in thickness, according to the size and condition of the animal, is cut off into "horse pieces" about eight inches wide by twelve to fifteen long, and a puncture made in each piece large enough to pass a rope through. After *fensing* the upper side the animal is rolled over and cut all around as above described. Then the horse pieces are strung on a raft-rope,* which is taken to the edge of the surf and a long line made fast to it, the end being thrown to a boat that lies just outside of the rollers. They are thus hauled through the breakers and towed to the vessel, where they are tried out on board.

The oil produced is superior to whale oil for lubricating purposes. The individual yield may be less than a barrel with the smaller males and females, but the larger males make from three to seven. Owing to the continual pursuit of these animals they have become nearly, if not quite, extinct, or have fled to some isolated, unknown points for security. The latter conjecture, however, seems hardly probable, for the Sea-elephant, it is said, has never been found in the north Pacific, except on the coasts of the Californias.

Notice of some extinct VERTEBRATES from Wyoming and Dakota.

BY JOSEPH LEIDY, M. D.

1. OMOMYS CARTERI.

On several occasions, Mr. J. Van A. Carter, of Fort Bridger, Wyoming, sent to me a number of fossils consisting of small blackened fragments of bones, together with casts of fresh water shells, obtained from a tertiary formation. In one of his letters, Mr. Carter remarks that the country in his vicinity is covered with buttes, composed mostly of a gray sandstone, easily worn by the weather, wind and snow. Particular strata of a greenish gray cast contain the fossils.

Portions of rock accompanying the fossils consist of a crumbly, greenish gray, granular material, with few imbedded fragments of soft and more homogeneous rock. Some of the specimens contain multitudes of minute whitish concretions having a concentric arrangement. The fossil shell casts for the most part consist of what appear to be a species of *Melania* and of *Planorbis*. The bone fragments consist of remains of teleost fishes but mainly of reptiles, generally too imperfect for specific identification. The reptilian remains, mostly of turtles, indicate several species of *Trionyx*, *Emys*, etc.; a Crocodilian is also represented.

Among the fossil bones from the same formation, Mr. Carter sent me a portion of the cranium of a small mammal reduced to indeterminate fragments except a few pieces, which indicated apparently the skull of a carnivorous animal about the size and general form of that of the Mink. Fragments of the parietals and contiguous bones adherent to a portion of matrix, exhibit a long, low sagittal crest separating a capacious pair of temporal fossæ with surfaces almost as convex as in the Mink. A portion of the supra-occipital and condyles, adherent to another portion of matrix, enclose a foramen four lines in transverse diameter.

As Dr. Carter informed me that he had obtained the fossil cranium from its position in the rock, at my solicitation he examined the locality for other portions of the skull, and had the good luck to discover the greater part of the right ramus of the lower jaw, apparently of the same animal. This specimen indicates an insectivorous mammal, probably belonging to the family of the hedge-hogs. Among living insectivora, described and figured by DeBlainville,

* A rope three fathoms long, with an eye spliced in one end.

Gervais, Peters, Mivart, and others, the jaw fragment approaches most nearly in size and form the corresponding portion in the representations of *Tupaia ferruginea*, of Java and neighboring isles. It likewise nearly resembles in size and form the corresponding portion of a fossil jaw, found in a miocene formation of Sansan, France, and referred to an insectivorous animal with the name of *Galerix viveroides*. The extremities of the ramus are lost, and the remaining portion contains four molar teeth. The depth of the jaw below the position of the latter measures about two lines and is nearly uniform. The base is but slightly convex fore and aft, below the position of the teeth. Back of these to the broken end of the specimen it is slightly concave. The mental foramen is below the position of the second premolar, and the symphysial articulation reached as far back as the third. The masseteric impression is well marked, and well defined about two lines back of the position of the second true molar.

Seven molar teeth, in an unbroken series, appear to have occupied the side of the jaw. Four appear to have been double-fanged premolars with laterally compressed conical crowns. Only the third and fourth of the latter are preserved. The alveoli of the second are retained, and also the inner side of what appears to be a pair for the first premolar.

The last true molar, which has lost its crown in the specimen, appears to have been a double fanged tooth, constructed like those in advance.

The teeth in the specimen from the third premolar to the second true molar successively, and after the former, gradually decline in height or prominence.

The third and fourth premolars nearly resemble in general form and proportions the second and third premolars of the Opossums. The true molars are constructed on the same general pattern as those of the genera *Sorex*, *Erinaceus*, *Gymnura*, *Potomogale*, *Galeopithecus*, and the Opossums. All the teeth are provided externally with a basal cingulum or ridge, nowhere elevated into points or cusps.

The crown of the third premolar, more prominent than in any other tooth, is triangular, longer than broad, pointed, and thicker posteriorly. Its anterior border is acute and slightly convex in the length; the posterior outline, formed by the back part of the outer convex surface, is slightly concave. The inner surface, narrower than the outer, presents at its fore part below, a narrow ledge feebly continuous forward as an element of the basal cingulum. This is best developed as a talon at the back of the crown, and least externally and postero-internally. The outer surface of the crown, convex transversely, is continuous posteriorly.

The fourth premolar has nearly the same form as the preceding tooth, but its crown is lower and wider. The basal cingulum is rather better developed externally and less so antero-internally. The inner surface is sensibly concave, and the ridge defining it from the postero-external surface exhibits a feeble tendency to form an accessory point.

The crowns of the two succeeding true molars, retained in the specimen, are nearly alike in size and form, though the first is in a trifling degree wider and higher. They are bounded by a well marked basal cingulum externally, nearly half their depth, reaching across the median valley and also anteriorly, but ceasing and becoming obsolete behind.

Two cusps or lobes project at the outer part of the crown of the true molars, and three smaller ones internally. Of the outer cusps the anterior is the higher and narrower. Of the inner ones the posterior two are nearly equal and the anterior is the smallest; most so in the second molar. They are all three-sided pyramids, each with one face directed inwardly and two outwardly. Their height is not greater than their width, nor are they very sharply pointed. The borders defining the inner surface of the antero-external cusps conjoin the antero-internal two cusps, including a small depression. Of the borders defining the inner concave surface of the postero-external cusp, the front one joins the posterior surface of the antero-external cusp, while the back one joins the postero-internal cusp.

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The space occupied by the molar series was about $6\frac{1}{2}$ lines. The length of the crown of the third premolar is one and one-fifth lines; the breadth 1 line. Length of crown of second premolar five-sixths of a line, breadth one and one-fifth lines. Breadth of first true molars $1\frac{1}{4}$ lines.

Unlike the corresponding part of any other insectivorous animal known to me, I have referred the jaw fragment to a new genus, and have dedicated the species to its discoverer, with the name of *Omomys Carteri*.

2. *NANOHYUS PORCINUS*.

In the expedition of Dr. F. V. Hayden, in the summer of 1866, to the Mauvais Terres of White River, Dakota, among the fossil vertebrate remains previously noticed or described, he discovered a fragment of the left ramus of the lower jaw of a small mammal, supposed to be nearly allied, if not belonging to the suiline family.

The teeth in the fragment consist of the last temporary molar; the succeeding two permanent molars in functional position, and the anterior portion of the third molar partially protruded. The interior of the jaw beneath the temporary molar is occupied by the crown of the last premolar, which, judging from the appearance of the exposed outer part, has the same form and size as the molars behind.

The temporary molar is inserted by a pair of widely separated fangs, and its crown presents the usual greater breadth than in the succeeding pair of those of the teeth behind, as in pachyderms generally. The crown is trilobate externally and internally, and this condition probably corresponds with three constituent pairs of lobes, the distinction of which is for the most part obliterated by wearing. The median division of the crown is largest, and that in advance is the smallest. The abraded summit of the former presents an irregularly transverse quadrate surface of exposed dentine continuous with a smaller subreniform tract upon the anterior division. The posterior division of the crown still exhibits the distinction of a transverse pair of lobes, of which the outer one is much the larger. This presents on its abraded summit a crescentoid surface of exposed dentine, and the inner one a minute circular islet of the same substance, and both are considerably below the level of the worn surfaces of the divisions of the crown in front.

The two permanent true molars preserved in the specimen are alike in form and size, and the anterior portion of the last molar agrees in character with the corresponding portion of the teeth in advance.

The crown of the first and second true molars is composed of two transverse pairs of conical lobes of which the anterior are about a third higher than the posterior, and are separated from them by a deep transverse valley. The inner and outer lobes are separated by a valley almost half the depth of the former, closed at the fore and back part of the crown by a small tubercle. The front tubercle is most conspicuous, and receives a feeble offset or ridge from the antero-external lobe. A similar offset from the postero-external lobe ends in the middle of the transverse valley of the crown. A basal ridge exists nowhere except at the fore part of the crown, where it is most conspicuous externally and is there associated with the tubercle closing the front of the fore and aft valley of the tooth.

A minute circular islet of exposed dentine occupies the summits of the anterior lobes of the crown of the first true molar.

The breadth of the crown of the last temporary molar is $2\frac{1}{4}$ lines. The breadth of the crown of the second unworn permanent true molar is $1\frac{3}{4}$ lines, and its height at the anterior division is the same.

The depth of the jaw fragment below the first permanent true molar is one fourth of an inch. The base is moderately convex fore and aft.

Though I have found it difficult to ascertain, by comparison with figures, how far the fossil described differs from the corresponding portion of other known animals, it nevertheless appears to me to do so sufficiently to refer it to a distinct genus and species, for which I have proposed the name of *Nanohyus porcinus*.

1869.]

3. *TRIONYX GUTTATUS*.

Remains apparently of the same species of *Trionyx* as that indicated by the small fragments above mentioned, were discovered by Dr. F. V. Hayden in a Tertiary deposit at Church Buttes, near Fort Bridger, Wyoming. The most characteristic specimen obtained by Dr. Hayden, during a geological survey on account of the Commissioners of the General Land Office at Washington, belongs to the Geological Cabinet of that Office, and has been submitted to my inspection by its Secretary, Dr. A. R. Roessler.

The specimen consists of the portion of a carapace adherent to a homogeneous, greenish gray, argillaceous rock. It retains the third to the seventh vertebral plates inclusively entire, with part of the second one; and the 6th and 7th right costal plates, together with parts of those of the second to the fifth inclusively of the same side, and smaller portions of several of the same plates of the left side.

The plates are for the most part marked by distinct or separate circular pittings, which only run into one another more or less at the outer third of the costal plates.

The carapace appears to have been longer than broad, and has approximated about 14 inches in length by about a foot in breadth. The fourth and fifth costal plates appear to have been unusually expanded or widened outwardly. The sixth costal plates conjoin in the median line, though their inner angles are separated by the sixth and seventh vertebral plates. The breadth of the last costal plate is within half an inch of its length.

The third vertebral plate is six-sided or coffin-shaped in outline. It measures 23 lines long, 5 lines wide at the fore part, gradually widening to a little over an inch, and then rapidly narrowing to 8 lines at its back part.

The second vertebral plate appears to have had the same form and a somewhat greater size.

The fourth vertebral plate in the specimen is rather irregular at the sides, and the right posterior angle is twice as long as on the left side. Its length is $20\frac{1}{2}$ lines; its width where greatest posteriorly is $10\frac{1}{2}$ lines.

The fifth vertebral plate is smaller than the former and has its lateral borders approaching in a curve at the hinder extremity. Its length is $19\frac{1}{2}$ lines; its anterior border is 7 lines wide, and its greatest breadth is $8\frac{1}{2}$ lines.

The sixth vertebral plate is cordiform or five-sided in outline, and is almost 10 lines in length and breadth.

The seventh vertebral plate is lozenge-shaped and occupies the interval between the approximate angles of the 6th and 7th pairs of costal plates. It is $5\frac{1}{2}$ lines long and 5 lines wide.

The last costal plates include a deep wide emargination behind, and each exhibits a deeper and more abrupt notch at the outer extremity. The length of the plate from the back angle of the last vertebral plate to its outer end, in a straight line is 25 lines; its breadth is 19 lines.

The length of the sixth costal plate along the middle is 41 lines. It is narrowest at the middle, where it measures 16 lines. At the inner extremity it is $19\frac{1}{2}$ lines wide; at the outer end 18 lines.

The length of the fifth costal plate along the middle is 57 lines; its breadth internally 22 lines; externally 40 lines. The species may be distinguished by the name of *Trionyx guttatus*.

4. *EMYS WYOMINGENSIS*.

An episternal bone, among the specimens, obtained by Mr. Carter near Fort Bridger, Wyoming, indicates a species of *Emys* about as large as the living *Emys* (*Trachemys*) *scabra* or *E. (Ptychemys) rugosa*, but it possessed a proportionately thicker shell than in either of these species. The bone is remarkably like the corresponding one of *Emys petrolei* (Pr. A. N. S. 1868, 176) from Harden Co., Texas, but is shorter along the median suture, proportionately broader and rather less produced at its fore part.

The portion of the bone impressed by the gular scutes projects abruptly for-

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ward about a fourth of an inch, and ends in a transverse truncate border, which in the entire sternum would measure two inches in width. The position of the ento-sternal plate, of the usual form, at the suture of the epi- and hyo-sternal plates would measure 22 lines in breadth. The depth of the episternal to the ento-sternal is 11 lines; the breadth at the posterior suture 14 lines. In the specimen near the median suture there exists a groove, apparently indicating a long narrow scute intervening between the gular scutes, but not reaching the anterior border of the sternum within four lines. This last mark may perhaps be an anomalous one.

5. *CROCODILUS APTUS*.

Dr. A. R. Roessler, in charge of the Geological Cabinet of the General Land Office, Washington, has submitted to my inspection a specimen from the collection consisting of a cervical vertebra of a Crocodile. The specimen was found by Col. John H. Knight, U. S. A., near South Bitter Creek, where it crosses the stage route about 70 miles west of the summit of the Rocky Mountains, in western Wyoming. It is thoroughly petrified, and the bone appears to have been of mature age. It has lost the greater part of the neural arch with the dependent processes, but is otherwise perfect. It belonged to an animal about the size of the Mississippi Alligator, and the bone bears a near resemblance with the corresponding sixth or seventh cervical vertebra of that species. The hypapophysis has the same character, projecting obliquely from the fore part of the centrum, but the latter is less carinated back of the process.

Length of centrum in its axis 16 lines; height and breadth in front 14 lines. Length of hypapophysis below the anterior articular concavity of the centrum 5 lines.

Probably the vertebra may belong to the same species as less characteristic fragments of bone, found by Mr. Carter, near Fort Bridger, in the same territory.

Descriptions of new *CRINOIDEA* and *ECHINOIDEA*, from the Carboniferous rocks of the Western States, with a note on the Genus *ONYCHASTER*.

BY F. B. MEEK AND A. H. WORTHEN,
Of the Illinois State Geological Survey.

Genus *SYNBATHOCRINUS*, Phillips, 1836.

SYNBATHOCRINUS WACHSMUTHI, M. and W.

Body below the top of the first radial pieces nearly semi-globose, or approaching semi-oval, being about twice as wide as high, and rounding to the column below. Base forming one-third to nearly one-half the height, somewhat basin shaped, and obscurely pentagonal in outline as seen from below; basal pieces, with the two larger divisions wider than high, and hexagonal in outline, and the smaller about as wide as high, and pentagonal in form. First radial pieces two-thirds to three-fourths as high as wide, with a general quadrangular outline, but two of those on the anal side, have each one of the superior lateral angles slightly truncated to form a notch for the reception of the first anal piece, so as to give each an additional angle. Second radial pieces of nearly the same size as the first, but not tapering upward as much as the first do downward, quadrangular in outline, and generally about three-fourths as long as wide. First anal piece about half as wide as long, pentagonal in form and equaling the length of the second radial pieces; second anal piece nearly half as long as the first, on the truncated upper end of which it rests; trigonal in outline, the upper angle being acute.

Arms very long and very gradually tapering, angular along the middle of the dorsal side, and each composed of more than thirty quadrangular pieces, 1869.]